REMARKS

Claims 1-3, 11, and 13-25 are pending in the present application, because claims 4-10 and 12 were canceled in the Preliminary Amendment filed September 14, 1999. It appears that the Examiner has examined claims 1-3, 11, 13, 16-20 and 23-24. Claims 14-15, 21-22 and 25 appear to be withdrawn from consideration as being drawn to a non-elected invention. Claims 1, 11 and 17 are independent claims.

Applicants have amended claim to add language that was inherently present in the claimed subject matter. The specification on page 6, paragraph 5 provides support for the amendment to claim 1. The specification on page 6, paragraph 3 provides support for the amendment to claim 11. All other amendments are clerical in nature. Applicants have not raised any issue of new matter.

Applicants have corrected the drawings.

Foreign Priority

The Examiner reports that foreign priority documents have not been received. This application is a Division of U.S. Application 08/676,882, July 3, 1996, now U.S. Patent 6,100,241; therefore, Applicants respectfully request the Examiner to review the parent application to see if the certified foreign priority document is present. Applicants need to know, if 08/676,882 has

an original foreign priority document in it file wrapper before Applicants can act.

Issue Under 35 U.S.C. §112, First Paragraph

Claims 3, 17, 18, 23 and 24 stand rejected under 35 U.S.C. §112, first paragraph, because the specification allegedly fails to provide an enabling disclosure for any fragment of the isolated protein. Applicants traverse this assertion.

The specification clearly enables an isolated 37kd protein from Eimeria acervulina consisting of the amino acid sequence set forth in SEQ ID NO.:2 and a vaccine containing the 37kd protein. However, the SPE asserts that a skilled artisan would suffer an undue burden of experimentation to make the immunogenic fragments thereof.

The Examiner asserts that the present disclosure fails to provide enablement of fragments and the one fragment present, GWIKQEEVDDIVQK, is not enabled for its use as a vaccine. Applicants direct the Examiner to page 8, line 31 through page 9, line 2 and page 14, last paragraph. Applicants clearly address this issue.

A specification must, in order to be enabling as required by 35 U.S.C §112, first paragraph, teach a person skilled in art to make and use an invention without "undue experimentation," which does not preclude some experimentation. Enablement is a question

of law which is reviewed independently on appeal. It is well settled that patent applicants are not required to disclose every species encompassed by their claims, even in an unpredictable art. In re Angstadt, 537 F.2d 498, 502-03, 190 USPQ 214, 218 (CCPA 1976). However, there must be sufficient disclosure, either through illustrative examples or terminology, 23 to teach those of ordinary skill how to make and how to use the invention as broadly as it is claimed. This means that the disclosure must adequately guide the art worker to determine, without undue experimentation, which species among all those encompassed by the claimed genus possess the disclosed utility. In re Vaeck, 20 U.S.P.Q.2d 1438, 1445 (Fed. Cir. 1991).

Applicants have considered the list of requirements for enablement set forth by the Examiner. Applicants assert that the parameters set forth are not the law. The requirement of indication each of fragment that will retain activity of the intact protein is wrong. Pharmaceutical patent applications always contain compounds that have not been tested for activity; however, it is common practice to grant such compound patents with the understanding that some experimentation would be needed to make and show each and every compound. It is unreasonable that each fragment must be identified and tested.

More importantly, Applicants are not inviting one to experiment. Applicants have set forth one fragment as admitted by the Examiner. Applicants have set forth disclosure that a

skilled artisan would need to understand how to locate, isolate or synthesize and use immunogenic determinant by indicating this is done by Kyte-Doolittle plots, by Hopp-Woods plots and by surface-exposure plots of the Eimeria LDH. Proof of the effectivity of using such tools was provided pointing to the paper by Margalit et al (1987, J. of Immunol., vol. 138, p.2213-2229.

Applicants respectfully submit that the present claims are enabled and would not lead to an undue burden of experimentation. The Examiner herself has presented alleged prior art that describe techniques known already in 1975 to determine size and specificity of *Eimeria* LDH enzymes in crude samples. Therefore, Applicants respectfully request withdrawal of the 35 U.S. §112, first paragraph rejection.

Issue Under 35 U.S.C. §102(b)

Claims 1-3, 11, 16-20 and 23-24 stand rejected under 35 U.S.C. §102(b) as being anticipated by Shirley (Parasitology, 71:369-376, 1975). Applicants assert that patentable distinction exists between the cited prior art and the present invention.

Distinction Between the Present Invention and Shirley

Shirley allegedly discloses lactate dehydrogenase enzyme from E. acervulina. Shirley discloses a biochemical

characterization of crude samples from Eimeria sporozoites, merozoites and oocysts. The characterization applied is starch-gel electrophoresis and substrate incubation.

The Examiner makes an inherency argument that the isolated protein of the present invention is present within the mixture disclosed. Furthermore, the Examiner asserts that the vaccine claim is an intended use of the enzyme.

Shirley fails to disclose or suggest a protein expressed *in vitro*, comprising one or more immunoreactive and/or antigenic determinants of *Eimeria* lactate dehydrogenase (LDH), wherein said isolated protein is found intracellularly in Eimeria; a vaccine for the protection of poultry against Coccidiosis comprising an effective amount of an isolated protein comprising one or more immunoreactive and/or antigenic determinants of Eimeria lactate dehydrogenase, wherein said isolated protein is found intracellularly in Eimeria; and an immunogenic fragment of Eimeria lactate dehydrogenase (LDH), wherein said LDH is immunogenically reactive with antiserum raised against the polypeptide of SEQ ID NO:2.

Shirley, at best, discloses a native intact Eimeria LDH protein. Shirley never mentions antigenic or immunogenic features. Shirley never mentions using these proteins as vaccines.

Applicants completely disagree with Examiner's statement that the recitation of "vaccine" is an intended use. The vaccine

claims stand alone. A vaccine claims can be clearly patentable, if is novel, even if the protein itself is anticipated. Shirley fails to discuss a vaccine; thus, it is completely impossible for Shirley to anticipate a "vaccine" claim.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Shirley fails to disclose each element of the present invention as set forth in the claims.

Applicants respectfully request withdrawal of the 35 U.S.C. §102(b).

Issue Under 35 U.S.C. §102(b)

Claims 1-3, 11, 16-18 and 23 stand rejected under 35 U.S.C. §102(b) as being anticipated by Kucera (Folia Parasitologica 36(4):295-299). Applicants assert that patentable distinction exists between the cited prior art and the present invention.

Distinction Between the Present Invention and Kucera

Kucera allegedly discloses lactate dehydrogenase enzyme from E. acervulina. Kucera discloses methods for performing techniques of Shirley (see above) with a certain type of electrophoresis equipment. Homogenized Eimeria oocysts are used.

The Examiner makes an inherency argument that the isolated protein of the present invention is present within the mixture disclosed. Furthermore, the Examiner asserts that the vaccine claim is an intended use of the enzyme.

Kucera fails to disclose or suggest a protein expressed *in vitro*, comprising one or more immunoreactive and/or antigenic determinants of *Eimeria* lactate dehydrogenase (LDH), wherein said isolated protein is found intracellularly in Eimeria; a vaccine for the protection of poultry against Coccidiosis comprising an effective amount of an isolated protein comprising one or more immunoreactive and/or antigenic determinants of Eimeria lactate dehydrogenase, wherein said isolated protein is found intracellularly in Eimeria; and an immunogenic fragment of Eimeria lactate dehydrogenase (LDH), wherein said LDH is immunogenically reactive with antiserum raised against the polypeptide of SEQ ID NO:2.

Kucera, at best, discloses a native intact Eimeria LDH protein. Kucera never mentions antigenic or immunogenic features. Kucera never mentions using these proteins as vaccines.

Again, Applicants completely disagree with Examiner's statement that the recitation of "vaccine" is an intended use. Kucera fails to discuss a vaccine; thus, it is completely impossible for Kucera to anticipate a "vaccine" claim.

"A claim is anticipated only if each and every element as

set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Kucera fails to disclose each element of the present invention as set forth in the claims.

Applicants respectfully request withdrawal of the 35 U.S.C. §102(b).

Issue Under 35 U.S.C. §102(b)

Claims 1-3, 16-18 and 23 stand rejected under 35 U.S.C. §102(b) as being anticipated by Nakamura et al (Journal of Veterinary Medical Science, 53(6):1101-1103, 1991. Applicants assert that patentable distinction exists between the cited prior art and the present invention.

Distinction Between the Present Invention and Nakamura et al.

Nakamura et al. allegedly discloses lactate dehydrogenase enzyme from E. acervulina. Nakamura et al. discloses Eimeria enzyme starch-gel electrophoresis, and uses enzymes samples from sporulated oocysts.

The Examiner makes an inherency argument that the isolated protein of the present invention is present within the mixture disclosed. Furthermore, the Examiner asserts that the vaccine claim is an intended use of the enzyme.

Nakamura et al. fails to disclose or suggest a protein expressed *in vitro*, comprising one or more immunoreactive and/or antigenic determinants of *Eimeria* lactate dehydrogenase (LDH), wherein said isolated protein is found intracellularly in Eimeria; a vaccine for the protection of poultry against Coccidiosis comprising an effective amount of an isolated protein comprising one or more immunoreactive and/or antigenic determinants of Eimeria lactate dehydrogenase, wherein said isolated protein is found intracellularly in Eimeria; and an immunogenic fragment of Eimeria lactate dehydrogenase (LDH), wherein said LDH is immunogenically reactive with antiserum raised against the polypeptide of SEQ ID NO:2.

Nakamura et al., at best, discloses a native intact Eimeria LDH protein. Nakamura et al. never mentions antigenic or immunogenic features. Nakamura et al. never mentions using these proteins as vaccines.

Again, Applicants completely disagree with Examiner's statement that the recitation of "vaccine" is an intended use. Nakamura et al. fails to discuss vaccine; thus, it is completely impossible for Nakamura et al. to anticipate a "vaccine" claim.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Nakamura et al. fails to disclose

each element of the present invention as set forth in the claims.

Applicants respectfully request withdrawal of the 35 U.S.C. §102(b).

Conclusion

All the stated grounds of the rejections have been properly traversed, accommodated or rendered moot. Applicants respectfully submit that the present application is in condition for allowance.

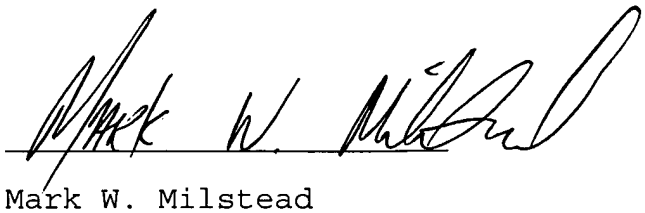
If the Examiner believes for any reason that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (302) 934-4395, in Millsboro, Delaware.

Pursuant to 37 C.F.R. §§1.17 and 1.136(a), Applicants respectfully petitions for a two month extension of time for filing a response in connection with the present application and the Commissioner is hereby authorized to charge the required fee of $420 to Deposit Account No. 02-2334.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2334 for any additional

fees required under 37 C.F.R. §1.16 or under 37 C.F.R. §1.17; particularly extension of time fees.

Respectfully submitted,



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Enclosure: Figure 1 and Figure 2